

NIST PRE-BOARD EXAMINATION-2072

Subject:- CHEMISTRY (SET-B3)

Grade:- XII

Time:- 3 hrs

FM:-75

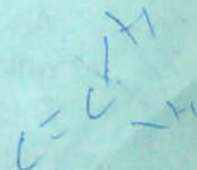
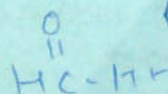
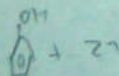
PM:-27

Group A

Attempt any fifteen questions:

[15X2=30]

1. Define hybridization. Draw the orbital picture of ethene indicating the types and number of bonds present in the molecule.
2. Define molar solution and end point. What volume of water must be added to 40 ml of 0.25 N acid solutions in order to make it exactly decinormal?
3. Two metals A and B have reduction potentials of -0.76 V and +0.34 V respectively. Which of the two liberate hydrogen from dilute H_2SO_4 ?
4. Compose the molar solubility of saturated solution of Ag_2CrO_4 and $AgBr$ if their solubility product constants are $1^{-1} \times 10^{-12}$ and 5.0×10^{-13} respectively.
5. Calculate the pH of a solution made by mixture 50ml of 0.01M $Ba(OH)_2$ solution with 50ml of water.
6. State Hess's Law of constant heat summation. Give one of its uses.
7. Explain the role of catalyst on the reaction rate with the help of energy profile diagram.
8. Aqueous solution of $NaCl$ is neutral while that of NH_4Cl is acidic, why?
9. What is wurtz-fitting reaction. Illustrate with an example.
10. Give the possible isomers of the molecular formula $C_4H_{10}O$ and their IUPAC names.
11. Convert: i) benzene to picric acid ii) phenol to aniline
12. Give a reaction which involves Aldol condensation.
13. Predict the products of following reactions:
i) $C_6H_5NO_2 \xrightarrow{Zn/NaOH/CH_3OH}$
ii) $C_6H_5NO_2 \xrightarrow{Zn/NH_4Cl}$



14. Identify the compounds [A] and [B] in the following conversion.
- $$A \xrightarrow[\text{Warm}]{\text{KOH/Br}_2} B \xrightarrow{\text{NaNO}_2/\text{dil. HCl}} \text{C}_2\text{H}_5\text{OH}$$
15. What happens when formic acid is treated with:
 a) Tollen's reagent b) Fehling's solution. $\text{Cu}^{2+} + \text{OH}^-$
16. Aliphatic amines are more basic than ammonia but aniline is less basic than ammonia. Explain.
17. Write monomers of which are used for the synthesis of the following polymers:
 i) Teflon ii) Bakelite
18. What is Zwitter ion. Give a molecule which exists as Zwitter ion.
19. Give an example of saturated fatty acid. How is unsaturated fat converted into saturated fat?
20. Define carbohydrate. Write the structure of D-glucose.
21. What happens when: i) zinc white is heated with cobalt nitrate?
 ii) metallic zinc is dissolved in hot conc. NaOH?
22. What happens when corrosive sublimate reacts with excess KI solution. Give the balanced chemical equation:

GROUP - B

Attempt any five questions:

[5x5=25]

23. Find the equivalent weight of H_3PO_4 in the reaction.
- i) $\text{Ca}(\text{OH})_2 + \text{H}_3\text{PO}_4 \rightarrow \text{CaHPO}_4 + 2\text{H}_2\text{O}$
- ii) 7.5 g of a dibasic acid dissolved in water and the solution made up to 250 c.c. 25 c.c. of this acid required 16.3 cc. 1(N) NaOH for complete neutralization. Calculate the molecular mass of the acid. (1+4)
24. What is meant by electrochemical cell? Design a Galvanic cell in which the reaction;
 $\text{Zn(s)} + 2\text{Ag}^+(\text{aq.}) \rightarrow \text{Zn}^{2+}(\text{aq.}) + 2\text{Ag(s)}$ takes place.
 Further predict:
 a) which of the electrode is negatively charged

$$M = \frac{MEV}{1000}$$

$$N = 0.0652$$

$$N \times \text{Eq. mass} = M$$

- COZNSU
- b) individual reaction at each electrode (1+2+2)
25. Define enthalpy of reaction. The standard enthalpies of formation $\text{H}_2\text{O}(\text{l})$, $\text{CO}_2(\text{g})$ and $\text{C}_6\text{H}_6(\text{l})$ are -286, -393.5 and + 49.02 KJ mole^{-1} respectively at 298 K. Calculate the standard enthalpy of combustion of $\text{C}_6\text{H}_6(\text{l})$ at the given temperature. (1+4)
26. Describe the laboratory method of the preparation of ethoxy ethane. (5)
27. Describe Victor Meyer's method for the distinction between primary, secondary and tertiary alcohols. Why is phenol more acidic than aliphatic alcohol? (4+1)
28. An aromatic compound A on reduction yields parent hydrocarbon B. B on nitration gives C. C on reduction in acidic solution gives D. On coupling with diazonium salts, D gives diazaminobenzene. Give names for A, B, C and D. Write the chemical reaction involved. (5)
29. Draw a neat labelled sketch of blast furnace for the extraction of pig iron and write the chemical reactions involved at different zones. (5)

GROUP - C

Attempt any two questions:

[10x2=20]

- 30.a) Define the rate of chemical reaction. How do concentration, temperature, catalyst and surface area of reactants affect the rate of reaction? (1+4)

(b) The following rate data were obtained at 303 K for the reaction



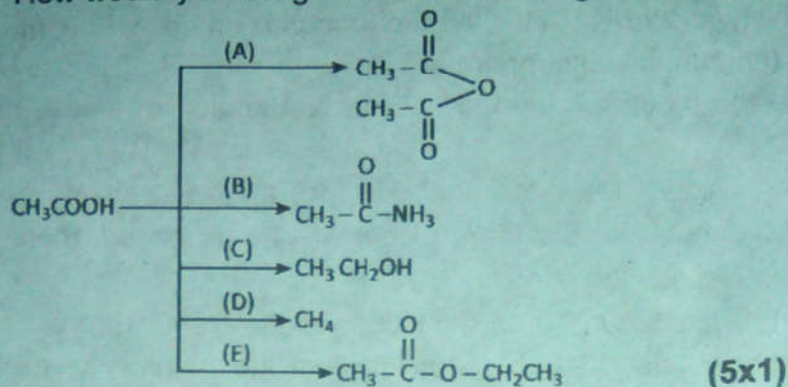
| Experiment | [A] mol L^{-1} | [B] mol L^{-1} | Initial rate of formation of [D] mol $\text{L}^{-1} \text{ min}^{-1}$ |
|------------|-------------------------|-------------------------|---|
| 1 | 0.1 | 0.1 | 6.0×10^{-3} |
| 2 | 0.3 | 0.2 | 7.2×10^{-2} |
| 3 | 0.3 | 0.4 | 2.88×10^{-1} |
| 4 | 0.4 | 0.1 | 2.4×10^{-2} |

- (i) Write the order with respect to each reactant and overall order.
 (ii) What is the rate law?
 (iii) Find the unit of the overall reaction. (3+1+1)

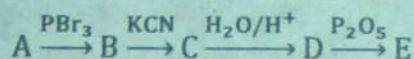
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rate constant

H, Na, Mg, Al,

31. How would you bring about the following conversions?



b) Consider a reaction



The compound A is a primary alcohol which gives positive iodoform test. Identify the organic compounds A, B, C, D and E.

(5)

32. Describe the preparation of pure and dry chloroform in the laboratory. Give its action upon:

a. heated silver b. aq. KOH c. aniline in presence of aqueous NaOH. Write two important uses of chloroform. (5+5)

33. Write short notes (any two):

- Extraction of copper from its sulphide ore.
- Electrochemical theory of rusting.
- Faraday's Laws of electrolysis.
- Common in effect.

(5x2=10)

Handwritten note:
 HCOOH